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## THE RESULTS OF SOME CLASSROOM MEASUREMENTS

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The purpose of this article is to set forth briefly the results of certain tests of the fundamental subjects of the elementary-school curriculum when applied to a school system. The work of the various grades, from the fourth to the eighth inclusive, was measured in the four fundamentals of arithmetic, spelling, writing, and composition and reading during last November and December and again in the spring. The primary object was to obtain a quick judgment on the merits of the general work of the schoolroom, to test the efficiency of the pupils and teachers, and thus to secure an adequate basis for supervision.

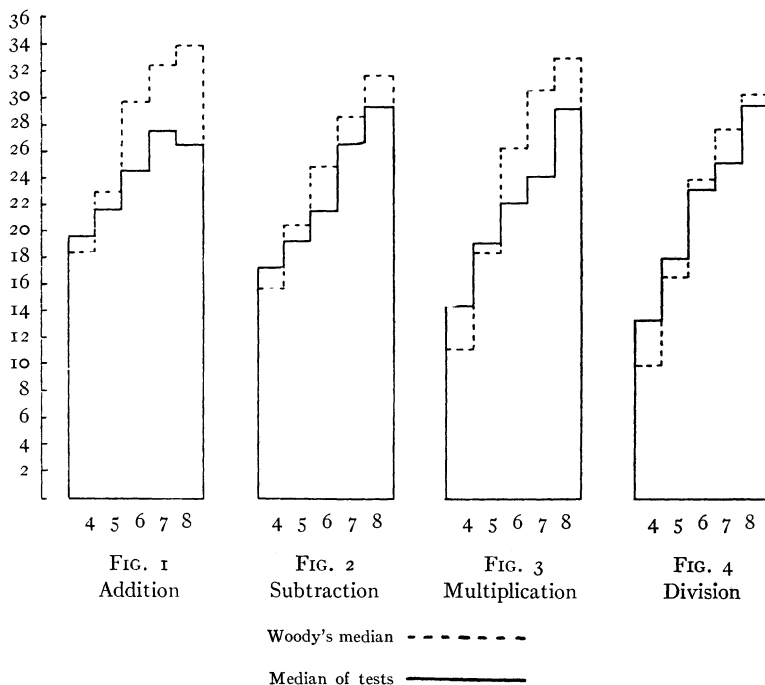
The following scales were used in testing the work of sixteen schools, suburban and rural: Woody's Arithmetic Scales, Teachers College Contribution to Education No. 80; Ayers's Spelling and Writing Scales, Russell Sage Foundation; Hillegas Composition Scale, Teachers College Publication, 1913, and *Teachers College Record*, January, 1917; Brown's Reading Measurements, Bureau of Research, Concord, New Hampshire.

In Woody's tests the problems are graded beginning with a very easy problem, such as may be readily performed by a first-grade pupil and increasing in variety and difficulty to the last one, which is so difficult that only a small percentage of the pupils of the eighth grade are able to solve it correctly.

The results from this series of tests in the various grades are presented in Figs. 1 to 4. The broken lines in the figure indicate Woody's Standard Median, while the unbroken line shows the results of the tests under discussion. No spring tests in this same series were given owing to the fact that the standard medians were derived from tests given in November and December.

The conclusion drawn from the comparison of scores is that the method of teaching is quite consistent in the fundamental processes

of arithmetic, although not quite so efficient in drill as the teaching in the set of schools tested by Woody. Special weakness was shown in addition. More drill was called for in this subject. It was observed that the medians came very close together in division. This disclosed the fact that our supervision secured better process work than drill. Emphasis upon the process work doubtless



tended to strengthen the reasoning processes that are involved in division.

These tests also disclosed certain errors typical of classes and suggested matters to be emphasized in instruction. When a large number of the class failed to invert the divisor in the division of fractions, or when a large number failed to locate the decimal point properly in the performance of problems involving the use of decimals, the teacher should have known immediately that the class needed more practice in the particular processes. Other types of problems in which a class or certain individuals were found to be

weak, such as adding figures crosswise of the page, were located with the result that the class was afterward directed more intelligently in its work. It was evident that the supervision and teaching in this branch had been well done for a number of years.

In the graph in reading, Fig. 5, the broken line indicates Brown's Highest Grade Averages, the unbroken line shows the tests given

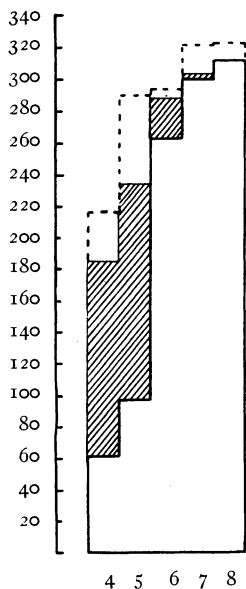



FIG. 5  
Reading

Fall tests —————  
Spring tests   
Brown's H.G. - - - - -

in the month of December, and the portion of the figure hatched-in shows the results of the spring tests. In this graph the medians of the upper fifth of the class (quintile) are compared with Brown's Highest Grade Averages. Since Brown's tentative standards were derived from the highest attainment found in a reasonable sized grade of normal pupils under normal conditions at the end of a year, and as there is a large amount of variation between the scores of different classes in the same grade the writer found that the median of the upper quintile afforded a fair basis for comparison. The correlation is so good that both class and individual weaknesses may be readily located.

A comparison of the medians of the tests in December and May disclosed inefficiency in the teaching of this subject. A tendency was shown for the reading to break down in the fifth grade, owing without doubt to too many changes in the style of teaching reading. There was too much reading aloud

for content and too much overemphasis upon improper phonic drill. As a result, more individual attention was given to cases which may be readily analyzed from a study of the rate of reading, the reproduction, and the comprehension scores. Physical and psychological defects in the individual were the subject of analysis. Reading solely as a class exercise was abandoned. Individuals now read to the class, and small groups are dealt with by the teacher. Statisti-

cal results have disclosed to the teachers the necessity for such changes. Since such methods of teaching have been the subject of scientific inquiry, the teachers have felt the need of instruction in the treatment of this subject. It was apparent from the improvement in the spring scores when compared with the fall scores that much was accomplished by the teaching force.

In Fig. 6 the unbroken line and the portion of the figure hatched indicate the medians of the fall and spring tests respectively. The broken line designates the tentative standard medians of the Hillegas Scale. The tentative standard medians show the quality of composition to be expected from at least half of a normal class of American boys and girls at the end of any given year.

The autumn tests disclosed the fact that the teachers hardly knew what to expect or require. No standards had been used as a basis of rating pupils. No models of what an adequate composition for a pupil of a certain grade should be were to be found previous to the standards set up in January of 1917.

In scoring the results the judgment of the teacher was developed in the use of the scale. The supervisor's judgment as a final check upon the rating given to the composition was regarded as sufficiently accurate. The results of the second series of tests showed much improvement over the first series given. The improvement is commensurate for nearly all grades. The high median score of the fourth grade was made possible by a good teacher in English composition. The low median in the seventh grade was the result of inattention

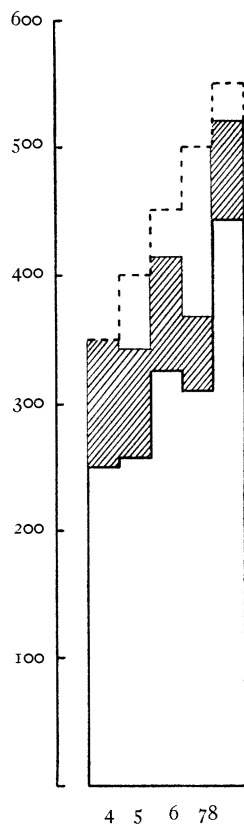



FIG. 6  
Composition

Fall median —————  
 Spring median   
 Hillegas standard median - - - - -

to the teaching of English composition on the part of an excellent teacher of English grammar. It was found that subnormal and supernormal children may be easily detected by the use of the scale. In order to comply with the demand on the part of the teachers for more explicit instructions in the teaching of composition, it was evident that the processes involved in the development of the subject must be tabulated and studied more fully.

The tests in spelling and writing were treated in like manner. All of the pupils of a class in spelling who scored 95 per cent or above were excused from further spelling lessons for a time, and the lesson was given over to the lower portion of the class. In writing, all of those who sustained an average above sixty on the Ayers's Scale were excused from special attention, leaving the hand to develop naturally. The teachers were required to watch for deterioration and allow no slovenly work in any subject to be passed (see New Hampshire State Course).

The general results of the tests have been to secure an accurate rating of the individual pupil that is reliable for grading properly and to stimulate a more careful, painstaking, and effective instruction in the various branches on the part of the teaching force. Diligent search has been made for the best educational literature, careful attention has been given to state and national developments, and in some cases special training has been sought. There is no further question as to whether definite standards of achievement are possible. They are located, and it is the purpose of the supervisory and teaching force to attain these standards of instruction or to know the reason why such results are not achieved.